Our ref: KON-1692 Client's ref: KPD-5034 US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: E. KATOH, et al		
Serial No. : 10/015,978	Group	: 1774
Filed : December 10, 2001	Examiner:	S. Betelhem
For : Ink Jet Recording Sheet		

DECLARATION

Assistant Commissioner of Patents
P.O. Box 1450
Alexandria, VA 22313-1450

S i r:

I, Yoshinori Tsubaki, hereby declare and say as follows:

1. I am a named Inventor in this Application.

2. I received a Master's Degree in Chemistry from Tokyo University of Science in 1998. After graduating, I was employed by Konica Corporation, the Assignee of this Application. During my employment with Konica, I have been engaged in research and development of image recording materials and, especially for recording materials used with ink jet printers.

3. I am aware that the Examiner has cited EP 1034940 (Ohbayashi), U.S. 6,338,891 (Kawasaki), U.S. 6,096,469 (Anderson), and U.S. 6,110,601 (Shaw-Klein) against this Application. In order to demonstrate the superior and unexpected affects of the Invention in this Application compared to these references, tests have been performed and are reported herein. These tests have been performed by me or under my direct supervision and control.

4. Five different ink jet recording sheets were prepared. The first recording sheet was prepared in accordance with Ohbayashi and, specifically, recording sheet #28, as recited in paragraph 169 of Ohbayashi, was prepared. As can be seen on Table 2 of Ohbayashi, this recording sheet contained aluminum chloride ($AlCl_3$). I note that Table 2 has a typographical error in that it records the aluminum chloride as Al_2Cl_3. This was an obvious typographical error because the formula for the aluminum chloride is $AlCl_3$ not Al_2Cl_3. The second recording sheet was prepared in the same manner as Sample # 28 of Ohbayashi except that the aluminum chloride was replaced with zirconium nitrate. The reason for replacing the aluminum chloride with zirconium nitrate is because the Examiner cited the Anderson reference as teaching

zirconium nitrate as a multi-valent metal salt employed in an ink jet recording sheet. The third ink jet recording sheet prepared was done in accordance with Shaw-Klein and, specifically, Element 1 of Example 1 as cited at Column 6, line 30. As reported in Shaw-Klein, this recording sheet contained calcium chloride. The fourth ink jet recording sheet was prepared in accordance with the present Invention and, specifically, sheet 53 was prepared as recited on page 67, lines 9-14 of this Application. The fourth recording sheet employed basic aluminum chloride (aluminum hydroxy chloride). The fifth ink jet recording sheet prepared was also in accordance with the present Invention and, specifically, recording sheet 9 as referred to on page 52, lines 4-17. The fifth recording sheet contained zirconyl acetate.

5. Each of these recording sheets were tested for surface pH before and after printing and water resistance. The method for measuring the pH before and after printing is described in the Application on page 56, lines 1-3. The black image was printed using the black ink, as cited on page 55 of the Application, and using a Desk-top type ink jet printer fitted with a piezo-type head. The water resistance test was conducted by printing a black stripe measuring 0.3 mm against a magenta solid image. The black ink and the magenta ink employed were those

referred to on page 55 of the Application. An ink jet printer was employed which was fitted with a piezo type head to apply these to the recording sheet. To each of the samples with the inks printed thereon, 1 ml of water was dropped onto the black stripe and then dried. The width of the stripe was measured before and after application of the water. The width of the stripe was measured using a micro densitometer. The width of the stripe was determined as a distance having a reflectance of 50% of the maximum density. The water resistance of the samples were defined using the following equation:

> Water resistance value = (Width of the stripe after water is dried) ÷ (Width of the stripe before Application of water).

The smaller the value of the water resistance the more resistant to water. A value of over 1.5 for water resistance is not acceptable for practical purposes. The water resistance of each one of the samples is recorded in the attached Table A.

6. As can be seen in Table A, each one of the Samples had a pH which fell in the range of the claims. It is also seen that Samples 1-3 had unacceptable water resistance in that the water resistance was greater than 1.5. The difference in water resistance is attributable to the nature of the metal salt which is employed. Specifically, it is deemed that the metal salts hold the dyes and provides for the superior water resistance of the ink jet recording sheet of the present Invention. I believe that these results are surprisingly unexpected and show that the Invention, in this Application, is superior to the tested materials.

It is declared by undersigned that all statements made herein of undersigned's own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements and the like so made are punishable by fine or imprisonment, or both, under section 18 U.S. Code 1001, and that such will false statements may jeopardize the validity of this Application or any patent issuing thereon.

Yoshinori Tsubaki

Yoshinori Tsubaki

Dated: This 13th day of may, 2003.

Encl: Table A

Table A

Sample No.	Remarks	Reference	Metal salt	pH Before print/ After print	Water Resistance value
1	Ohbayashi Recording sheet 28	EP'940	$AlCl_3$	5.3/ 5.7	2.11
2	Anderson S-1	US'469	$Zr(NO_3)_4$	4.0/ 4.3	2.04
3	Shaw-Klein Element 1	US'601	$CaCl_2$	4.0/ 4.6	3.25
4	Sheet 53	Present invention	Basic aluminum chloride	4.3/ 4.8	1.42
5	Sheet 9	Present invention	zirconyl acetate	3.5/ 4.7	1.33